

SUMMARY OF THE INVENTION

[0013] According to one aspect of the present invention there is provided a detector for providing position detection of a first kind together with position detection of a second kind, the detector comprising:

[0014] a sensor,

[0015] a patterned arrangement of sensing conductors extending within the sensor, and

[0016] detection circuitry associated with the arrangement for detecting signals at same sensing conductors arising from the position detection of a first kind and signals arising from the position detection of a second kind, therefrom to detect positions at the sensor.

[0017] Preferably, the position detection of a first kind comprises resonance-based object detection of an object able to produce an electromagnetic resonant field.

[0018] Preferably, the position detection of a first kind comprises capacitive-based touch detection.

[0019] Preferably, the position detection of a first kind comprises resonance-based object detection of an object able to produce an electromagnetic resonant field and the position detection of a second kind comprises capacitive-based touch detection.

[0020] Preferably, the detection circuitry is capable of detecting interactions of the first kind and the interactions of the second kind simultaneously.

[0021] Preferably, the detection circuitry is capable of detecting interactions of the first kind and the interactions of the second kind independently.

[0022] Preferably, the sensor is located over a detection region, and comprises an oscillator for providing an oscillating signal, excitation circuitry for providing an excitation signal capable of exciting a resonant circuit of an electromagnetic stylus-type object, wherein the patterned arrangement comprises conductive elements extending over the detection region, and wherein the detection circuitry is adapted for detecting the capacitive effect of a conductive object, such as finger touch, and resonance from the electromagnetic stylus-type object at the at least one conductive element.

[0023] Preferably, the oscillator is connected to provide the oscillating signal to the excitation circuitry and also to provide an excitation signal for the capacitive based touch detection.

[0024] Preferably, the sensor is substantially transparent and suitable for location over a display screen.

[0025] Preferably, the detection region is the surface of a display screen and wherein the sensor including the at least one conductive element is substantially transparent.

[0026] The detector may comprise a plurality of conductive elements and the detection circuitry may comprise a differential detector arrangement associated with the sensing conductors for detecting differences between outputs of the conductors.

[0027] Preferably, the sensing circuitry is configured for sensing a signal at the at least one sensing conductive element induced by a touch of a conductive object subjected to a transmission of the oscillated signal.

[0028] Preferably, there is provided at least a second conductive element located within the sensor and having a junction with the one conductive element, wherein the oscillator is applied to one of the conductive element and the junction is configured such that a touch by a capacitive body part causes an a.c. short at the junction, the detector being configured to detect a resulting oscillating signal at the second conductive element and therefrom to infer the touch.

[0029] Preferably, the detection circuitry is adapted to detect a signal at the at least second conductive element for interpretation as a number of touching objects.

[0030] Preferably, multiple resonance-based objects can be detected based on the interpretation of properties of the detected signal.

[0031] Preferably, multiple conductive objects can be detected based on the interpretation of properties of the detected signal.

[0032] Preferably, the oscillator is connected to oscillate at least one of the detector, part of the detector and the at least one conductive element with respect to a reference voltage level, thereby to permit a capacitive current flow between a conductive touching object and the at least one conductor.

[0033] Preferably, the sensor is configured with a transparent medium between itself and an underlying display screen.

[0034] Preferably, the transparent medium comprises an air gap.

[0035] According to a second aspect of the present invention there is provided a detector for detecting touches by conductive objects making capacitive contact with a transparent sensor located over a display screen, the detector comprising:

[0036] a patterned arrangement of sensing conductors extending into the sensor,

[0037] a source of oscillating electrical energy at a predetermined frequency, and

[0038] detection circuitry for detecting a capacitive influence on the at least one sensing conductor when the oscillating electrical energy is applied.

[0039] Preferably, the detection circuitry comprises a differential detector arrangement associated with the sensing conductors for detecting differences between outputs of the conductors.

[0040] Preferably, the source of oscillating electrical energy is configured to transmit the energy into the conductive object, and the sensing circuitry is configured for sensing a signal at the at least one sensing conductive element induced by a touch of a conductive object subjected to the transmitted oscillated signal.

[0041] The detector is preferably configured to interpret a property of a signal detected at the at least one conductor in terms of a number of touching conductive objects.

[0042] Preferably, there is provided at least a second conductor located within the sensor and having a junction with the at least one conductor, wherein the source of